

Application No. 10/517,011

Filed: July 7, 2005

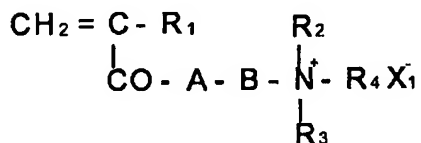
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AMENDMENT TO THE CLAIMS

1. (CANCELLED)

2. (CURRENTLY AMENDED) A water-soluble polymer dispersion in which a water-soluble polymer having at least one type of ionicity selected from among cationicity and amphotericity and occurring in the form of fine particles with a particle size of not greater than 100 μm and a polyalkylenimine in the sulfate salt form coexist, wherein the polymer is produced by dispersion polymerization of a monomer (or monomer mixture) comprising 5 to 100 mole percent of a monomer represented by the general formula (1) and/or (2) given below, 0 to 50 mole percent of a monomer represented by the general formula (3) given below and 0 to 95 mole percent of a water-soluble nonionic monomer with stirring in the presence of said polyalkylenimine in the sulfate salt form;



General formula (1),

wherein ~~In~~ the general formula (1), R_1 is a hydrogen atom or a methyl group, R_2 and R_3 may be the same or different and each is an alkyl or an alkoxy group containing 1 to 3 carbon atoms or a benzyl group, R_4 is a hydrogen atom, an alkyl or alkoxy group containing 1 to 3 carbon atoms or a benzyl group. A represents an oxygen atom or NH, B represents an alkylene or an alkoxy group

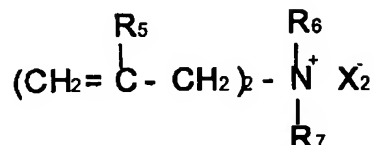
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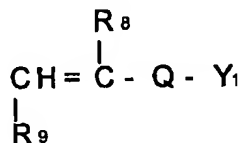
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containing 2 to 4 carbon atoms, and X_1 represents a sulfate anion- \rightarrow ;

General formula 2) 1

wherein ~~In~~ the general formula (2), R_5 represents a hydrogen atom or a methyl group, R_6 and R_7 each represents an alkyl or an alkoxy group containing 1 to 3 carbon atoms or a benzyl group, and X_2 represents a sulfate anion- \rightarrow ;

General formula (3) 1

wherein ~~In~~ the general formula (3), R_8 represents a hydrogen atom, a methyl group or a carboxymethyl group, Q represents SO_3 , $\text{C}_6\text{H}_4\text{SO}_3$, $\text{CONHC}(\text{CH}_3)_2\text{CH}_2\text{SO}_3$, $\text{C}_6\text{H}_4\text{COO}$ or COO , R_9 represents a hydrogen atom or COOY_2 , and Y_1 or Y_2 represents a hydrogen atom or a cation- \rightarrow

3. (PREVIOUSLY PRESENTED) A water-soluble polymer dispersion in which a water-soluble polymer having at least one type of ionicity selected from among anionicity and nonionicity and occurring in the form of fine particles with a particle size of not greater than 100 μm and a polyalkylenimine in the sulfate salt form coexist, wherein the polymer is produced by dispersion polymerization of a monomer composition (mixture) comprising at least one monomer selected from among monomers represented by said

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general formula (3) given above and water-soluble nonionic monomers in the presence of said polyalkylenimine in the sulfate salt form.

4-6. (CANCELLED)

7. (PREVIOUSLY PRESENTED) A water-soluble polymer dispersion in which a water-soluble polymer having at least one type of ionicity selected from among cationicity, an amphotericity, a nonionicity and an anionicity and occurring as fine particles with a particle size of not greater than 100 μm and a polyalkylenimine in the sulfate salt form coexist, wherein the polyalkylenimine is polyethylenimine.

8. (PREVIOUSLY PRESENTED) A water-soluble polymer dispersion in which a water-soluble polymer having at least one type of ionicity selected from among cationicity, an amphotericity, a nonionicity and an anionicity and occurring as fine particles with a particle size of not greater than 100 μm and a polyalkylenimine in the sulfate salt form coexist, wherein the polyalkylenimine amounts to 20 to 200% by mass relative to the water-soluble polymer.

9. (CURRENTLY AMENDED) A method of producing water-soluble polymer dispersions, wherein a dispersion of fine particles of a polymer having at least one type of ionicity selected from among cationicity and amphotericity is produced by subjecting a monomer (or monomer mixture) comprising 5 to 100 mole percent of a monomer represented by the general formula (1) and/or (2) given below, 0

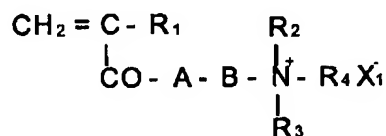
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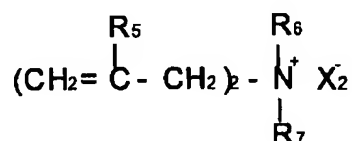
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to 50 mole percent of a monomer represented by the general formula (3) given below and 0 to 95 mole percent of a water-soluble nonionic monomer to dispersion polymerization with stirring in the presence of a polyalkylenimine in the sulfate salt form-;



General formula (1),

wherein ~~In~~ the general formula (1), R₁ is a hydrogen atom or a methyl group, R₂ and R₃ may be the same or different and each is an alkyl or alkoxy group containing 1 to 3 carbon atoms or a benzyl group, R₄ is a hydrogen atom, an alkyl or alkoxy group containing 1 to 3 carbon atoms or a benzyl group. A represents an oxygen atom or NH, B represents an alkylene or alkoxy group containing 2 to 4 carbon atoms, and X₁ represents a sulfate anion-;



General formula (2),

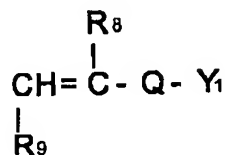
wherein ~~In~~ the general formula (2), R₅ represents a hydrogen atom or a methyl group, R₆ and R₇ each represents an alkyl or alkoxy group containing 1 to 3 carbon atoms or a benzyl group, and X₂ represents a sulfate anion-;

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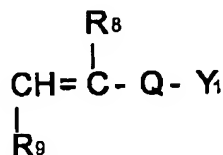
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General formula (3),

wherein ~~In~~ the general formula (3), R_8 represents a hydrogen atom, a methyl group or a carboxymethyl group, Q represents SO_3 , $C_6H_4SO_3$, $CONHC(CH_3)_2CH_2SO_3$, C_6H_4COO or COO , R_9 represents a hydrogen atom or $COOY_2$, and Y_1 or Y_2 represents a hydrogen atom or a cation.

10. (CURRENTLY AMENDED) A method of producing water-soluble polymer dispersions, wherein a dispersion of fine particles of a polymer having at least one type of ionicity selected from among anionicity and nonionicity is produced by subjecting a monomer composition (mixture) comprising at least one monomer selected from among monomers represented by the general formula (3) given below and water-soluble nonionic monomers to dispersion polymerization with stirring in the presence of a polyalkylenimine in the sulfate salt form;



General formula (3),

wherein ~~In~~ the general formula (3), R_8 represents a hydrogen atom, a methyl group or a carboxymethyl group, Q represents SO_3 , $C_6H_4SO_3$, $CONHC(CH_3)_2CH_2SO_3$, C_6H_4COO or COO , R_9 represents a hydrogen

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atom or COOY_2 , and Y_1 or Y_2 represents a hydrogen atom or a cation.

11. (PREVIOUSLY PRESENTED) A use of the water-soluble polymer dispersion according to any of Claims 2, 3, 7, 8, 23, 27, 31 and 35, wherein the water-soluble polymer dispersion is added to papermaking raw material before papermaking for pretreatment thereof.

12. (PREVIOUSLY PRESENTED) A use of the water-soluble polymer dispersion according to any of Claims 2, 3, 7, 8, 23, 27, 31 and 35, wherein the water-soluble polymer dispersion is added to papermaking raw material before papermaking to thereby improve the freeness thereof.

13. (PREVIOUSLY PRESENTED) A use of the water-soluble polymer dispersion according to any of Claims 2, 3, 7, 8, 23, 27, 31 and 35, wherein the water-soluble polymer dispersion is added to papermaking raw material before papermaking, in which a sizing agent coexists, to thereby improve the degree of sizing.

14. (PREVIOUSLY PRESENTED) A use of the water-soluble polymer dispersion according to any of Claims 2, 3, 7, 8, 23, 27, 31 and 35, wherein the water-soluble polymer dispersion is added to paper making raw material before papermaking to thereby improve the yield, followed by papermaking.

15. (PREVIOUSLY PRESENTED) A use of the water-soluble polymer dispersion according to any of Claims 2, 3, 7, 8, 23, 27, 31 and

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35, wherein the water-soluble polymer dispersion is added to paper making raw material before papermaking in combination with an inorganic and/or organic anionic substance to thereby improve the yield, followed by papermaking.

16. (PREVIOUSLY PRESENTED) A use of the water-soluble polymer dispersion according to any of Claims 2, 3, 7, 8, 23, 27, 31 and 35, wherein the water-soluble polymer dispersion is added to organic sludge or paper mill-derived sludge to cause flocculation, followed by dewatering by means of dewatering equipment.

17. (PREVIOUSLY PRESENTED) A use of the water-soluble polymer dispersion according to any of Claims 2, 3, 7, 8, 23, 27, 31 and 35, wherein the water-soluble polymer dispersion is added to organic sludge or paper mill-derived sludge in combination with an amphoteric or anionic water-soluble polymer to cause flocculation, followed by dewatering by means of dewatering equipment.

18-22. (CANCELLED)

23. (PREVIOUSLY PRESENTED) A water-soluble polymer dispersion according to Claim 2, wherein the polyalkylenimine is polyethylenimine.

24-26. (CANCELLED)

27. (CURRENTLY AMENDED) A water-soluble polymer dispersion according to Claim 2, wherein the polyalkylenimine amounts to 20 to 200% by mass relative to the water-soluble polymer.

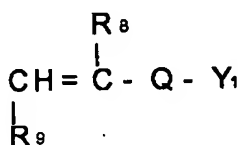
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28-30. (CANCELLED)

31. (PREVIOUSLY PRESENTED) A water-soluble polymer dispersion according to Claim 7, wherein the polyalkylenimine amounts to 20 to 200% by mass relative to the water-soluble polymer.

32-34. (CANCELLED)

35. (CURRENTLY AMENDED) A water-soluble polymer dispersion according to Claim 31, wherein the water-soluble polymer is produced by dispersion polymerization of a monomer composition (mixture) comprising at least one monomer selected from among monomers represented by said general formula (3) given below and water-soluble nonionic monomers in the presence of said polyalkylenimine in the sulfate salt form;



General formula (3)

wherein ~~In the~~ general formula (3), R_8 represents a hydrogen atom, a methyl group or a carboxymethyl group, Q represents SO_3 , $C_6H_4SO_3$, $CONHC(CH_3)_2CH_2SO_3$, C_6H_4COO or COO , R_9 represents a hydrogen atom or $COOY_2$, and Y_1 or Y_2 represents a hydrogen atom or a cation.

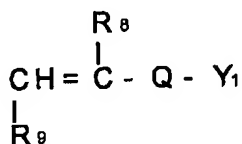
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28-30. (CANCELLED)

31. (PREVIOUSLY PRESENTED) A water-soluble polymer dispersion according to Claim 7, wherein the polyalkylenimine amounts to 20 to 200% by mass relative to the water-soluble polymer.

32-34. (CANCELLED)

35. (CURRENTLY AMENDED) A water-soluble polymer dispersion according to Claim 31, wherein the water-soluble polymer is produced by dispersion polymerization of a monomer composition (mixture) comprising at least one monomer selected from among monomers represented by said general formula (3) given below and water-soluble nonionic monomers in the presence of said polyalkylenimine in the sulfate salt form-i



General formula (3)1

wherein ~~In the~~ general formula (3), R_8 represents a hydrogen atom, a methyl group or a carboxymethyl group, Q represents SO_3 , $C_6H_4SO_3$, $CONHC(CH_3)_2CH_2SO_3$, C_6H_4COO or COO , R_9 represents a hydrogen atom or $COOY_2$, and Y_1 or Y_2 represents a hydrogen atom or a cation.1